



**WANG**

# **VS Cobol**

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## **Quick Reference Guide**



# **VS Cobol Quick Reference Guide**

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## **WARNING**

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

## INTRODUCTION

The VS COBOL Quick Reference is a guide intended for experienced COBOL programmers. It provides the syntax and program information you need to use the Wang VS COBOL compiler 3.8.4 or greater.

VS COBOL Language Syntax contains the general formats for the four program divisions. It also gives the formats for specific paragraphs and entries.

VS COBOL Statement Formats give the statement syntax used by the VS COBOL compiler. General formats for identifier, qualification, and conditions are also given. A glossary of terms is appended.

The guide also includes a list of VS COBOL Reserved Words, Hexadecimal To Decimal Conversion, Powers of 2 and 16, Field Attribute Characters (FACs), and Translation Table.

You need DMS/TX software and VS operating system 6.10 or greater to use DMS/TX statements. You also need VS operating system 6.20 or greater and any VS system, except VS 50 or VS 80, to use Relative Files.

For more information regarding syntax and general rules, consult the *VS COBOL Reference Manual* (800-1201).



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**VS COBOL LANGUAGE SYNTAX**

**Language Conventions**

The following conventions are used in this section:

Capitalized or uppercase words are reserved words and have preassigned meanings in COBOL. This does not apply to words in quotation marks.

Underlined reserved words are key words and must be used when that portion of the format is used. Optional reserved words are not underlined.

The characters “+”, “-”, “<”, “>”, “=”, or equivalent reserved words, although not underlined, are required within the chosen formats.

Words printed in lowercase letters represent information to be supplied by the programmer.

Brackets “[ ]” indicate an optional portion of the format.

Braces “{ }” indicate that one of the options within the braces must be selected.

When choice indicators, { [ ] }, enclose a portion of a general format, one or more of the unique options contained within the choice indicators must be specified, but a single option may be specified only once.

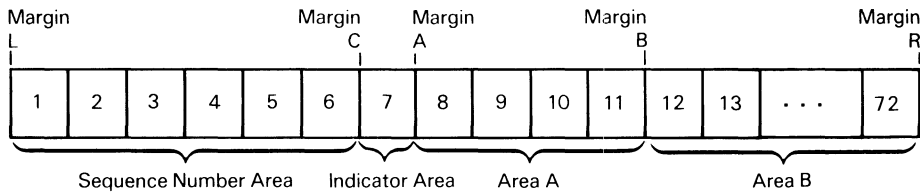
Options are stacked vertically within the brackets or braces. If one option within the brackets or braces contains only reserved words that are not underlined, that option is the default option.

An ellipsis “. . .” indicates a unit may be repeated. A unit is either a single lowercase word or a group of lowercase and reserved words enclosed in brackets or braces.

Entries shaded in **light gray** are treated as comments by the VS COBOL compiler and serve documentation purposes only.

Entries shaded in **dark gray** are VS extensions to ANSI COBOL.

The COBOL source-program reference format, which defines the permissible locations of COBOL code on a line of text, is:



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## VS COBOL Language Syntax

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### General Format for the Identification Division

#### IDENTIFICATION DIVISION.

PROGRAM-ID.            program-name.  
[ AUTHOR.            [comment-entry] ... ]  
[ INSTALLATION.    [comment-entry] ... ]  
[ DATE-WRITTEN.    [comment-entry] ... ]  
[ DATE-COMPILED. [comment-entry] ... ]  
[ SECURITY.        [comment-entry] ... ]

### General Format for the Environment Division

#### ENVIRONMENT DIVISION.

#### CONFIGURATION SECTION.

SOURCE-COMPUTER. WANG-VS [ WITH DEBUGGING MODE ].

OBJECT-COMPUTER.    WANG-VS  $\left[ \text{MEMORY SIZE integer} \left\{ \begin{array}{l} \text{WORDS} \\ \text{CHARACTERS} \\ \text{MODULES} \end{array} \right\} \right]$   
[ PROGRAM COLLATING SEQUENCE IS alphabet-name ].

#### SPECIAL-NAMES.

$\left[ \text{SWITCH-}n \text{ [ IS mnemonic-name ]} \right.$   
 $\left. \left\{ \begin{array}{l} \text{ON STATUS IS condition-name-1 [ OFF STATUS IS condition-name-2 ]} \\ \text{OFF STATUS IS condition-name-3 [ ON STATUS IS condition-name-4 ]} \end{array} \right\} \right] \dots$   
 $\left[ \text{alphabet-name IS} \left\{ \begin{array}{l} \text{STANDARD-1} \\ \text{NATIVE} \end{array} \right\} \right] \dots$   
[ CURRENCY SIGN IS literal-1 ]  
[ DECIMAL-POINT IS COMMA ].

#### FIGURATIVE CONSTANTS.

[ [ data-name-1 IS "hexadecimal-value" ] ... ]

#### INPUT-OUTPUT SECTION.

FILE-CONTROL. { file-control-entry } ...

#### I-O CONTROL.

[ RERUN [ ON file-name-1 ] EVERY integer-1 RECORDS OF file-name-2 ] ...

$\left[ \begin{array}{l} \text{SAME} \\ \left[ \begin{array}{l} \text{RECORD} \\ \text{SORT} \\ \text{SORT-MERGE} \end{array} \right] \end{array} \right] \text{ AREA FOR file-name-3 } \{ \text{file-name-4} \} \dots \dots$

### File Control Entry:

#### Consecutive File Organization

SELECT file-name

ASSIGN TO "parameter-reference-name"  $\left[ \begin{array}{l} \text{"DISK"} \\ \text{"DISPLAY"} \\ \text{"PRINTER"} \\ \text{"TAPE"} \end{array} \right] \text{ [NODISPLAY]}$

$\left[ \text{ORGANIZATION IS } \underline{\text{SEQUENTIAL}} \right]$

$\left[ \begin{array}{l} \text{ACCESS MODE IS } \left\{ \begin{array}{l} \underline{\text{SEQUENTIAL}} \\ \text{RANDOM} \\ \text{DYNAMIC} \end{array} \right\} \left[ \begin{array}{l} \text{RELATIVE KEY IS} \\ \text{data-name-1} \end{array} \right] \end{array} \right]$

$\left[ \text{FILE STATUS IS data-name-2} \right]$

$\left[ \begin{array}{l} \text{CURSOR POSITION IS data-name-3} \\ \text{BUFFER SIZE IS integer-1 BLOCKS} \\ \text{PFKEY IS data-name-4} \end{array} \right]$

#### Indexed File Organization

SELECT file-name

ASSIGN TO "parameter-reference-name"  $\left[ \text{"DISK"} \right] \text{ [NODISPLAY]}$

$\left[ \text{ORGANIZATION IS } \underline{\text{INDEXED}} \right]$

$\left[ \begin{array}{l} \text{ACCESS MODE IS } \left\{ \begin{array}{l} \underline{\text{SEQUENTIAL}} \\ \text{RANDOM} \\ \text{DYNAMIC} \end{array} \right\} \text{RECORD KEY IS data-name-1} \end{array} \right]$

$\left[ \text{ALTERNATE RECORD KEY } \text{integer-1} \text{ IS data-name-2} \right]$

$\left[ \text{WITH } \underline{\text{DUPLICATES}} \right]$

$\left[ \left[ \text{integer-2 IS } \right] \text{data-name-3} \right]$

$\left[ \text{WITH } \underline{\text{DUPLICATES}} \right] \dots$

$\left[ \text{FILE STATUS IS data-name-4} \right]$

$\left[ \begin{array}{l} \text{RESERVE integer-3} \\ \left[ \begin{array}{l} \text{AREA} \\ \text{AREAS} \end{array} \right] \end{array} \right]$

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## VS COBOL Language Syntax

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### Relative File Organization

SELECT file-name

ASSIGN TO "parameter-reference-name" [ "DISK" ] [ NODISPLAY ]

[ RESERVE integer-1 [ AREA  
AREAS ] ]

ORGANIZATION IS RELATIVE

[ ACCESS MODE IS { SEQUENTIAL  
RANDOM  
DYNAMIC } [ RELATIVE KEY IS data-name-1 ]  
RELATIVE KEY IS data-name-1 ] ]

[ FILE STATUS IS data-name-2 ]

[ BUFFER SIZE IS integer-2 BLOCKS ]

### Sort-Merge File Organization

SELECT file-name

ASSIGN TO "parameter-reference-name" [ "DISK"  
"TAPE" ] [ NODISPLAY ]  
[ BUFFER SIZE IS integer BLOCKS ]

### General Format for Data Division

DATA DIVISION.

[ FILE SECTION.

[ file-description-entry ]

{ record-description-entry } . . . ] . . .

[ WORKING-STORAGE SECTION.

[ 77-level-description-entry ] . . .

[ record-description-entry ] . . . ]

[ LINKAGE SECTION.

[ 77-level-description-entry ] . . .

[ record-description-entry ] . . . ]

### File Description Entry:

#### Format 1

FD file-name

[ BLOCK CONTAINS [ integer-1 TO ] integer-2 { RECORDS  
CHARACTERS } ]

[ RECORD CONTAINS [ integer-3 TO ] integer-4 COMPRESSED CHARACTERS ]

LABEL      { RECORD IS }      { STANDARD }  
                  { RECORDS ARE }      { OMITTED }

|          |                    |                           |                                   |
|----------|--------------------|---------------------------|-----------------------------------|
| VALUE OF | {                  | <u>FILENAME</u> IS        | { data-name-1                     |
|          |                    |                           | { literal-1                       |
|          |                    | <u>LIBRARY</u> IS         | { data-name-2                     |
|          |                    |                           | { literal-2                       |
|          |                    | <u>VOLUME</u> IS          | { data-name-3                     |
|          |                    |                           | { literal-3                       |
|          |                    | <u>SPACE</u> IS           | data-name-4                       |
|          |                    | <u>POSITION</u> IS        | data-name-5                       |
|          |                    | <u>INDEX AREA</u> IS      | data-name-6                       |
|          |                    | <u>DATA AREA</u> IS       | data-name-7                       |
|          | {                  | <u>RECOVERY-BLOCKS</u> IS | { data-name-8                     |
|          |                    |                           | { literal-4                       |
|          |                    | <u>RECOVERY-STATUS</u> IS | data-name-9                       |
|          |                    | <u>DATABASE-NAME</u> IS   | data-name-10                      |
| DATA     | {                  | <u>RECORD</u> IS          | data-name-11 [ data-name-12 ] ... |
|          | <u>RECORDS</u> ARE |                           |                                   |

[ CODE-SET IS alphabet-name ] .

## Format 2

SD file name

BLOCK CONTAINS integer-1 { RECORDS  
CHARACTERS }

[ RECORD CONTAINS [ integer-2 TO ] integer-3 COMPRESSED CHARACTERS ]

$$\left[ \text{VALUE OF} \left\{ \begin{array}{l} \text{VOLUME IS} \quad \left\{ \begin{array}{l} \text{data-name-1} \\ \text{literal-1} \end{array} \right\} \\ \text{SPACE IS} \quad \text{data-name-2} \end{array} \right\} \right]$$

|      |                               |                                 |
|------|-------------------------------|---------------------------------|
| DATA | {<br>RECORD IS<br>RECORDS ARE | data-name-3 [ data-name-4 ] ... |
|------|-------------------------------|---------------------------------|

## VS COBOL Language Syntax

### Data and 77-Level Description Entries:

#### Format 1

level-number  $\left\{ \begin{array}{l} \text{data-name-1} \\ \text{FILLER} \end{array} \right\} \quad [ \text{REDEFINES data-name-2} ]$

$\left[ \left\{ \begin{array}{l} \text{PICTURE} \\ \text{PIC} \end{array} \right\} \text{ IS character-string} \right] \left[ [ \text{USAGE IS} ] \left\{ \begin{array}{l} \text{BINARY} \\ \text{COMPUTATIONAL} \\ \text{COMP} \\ \text{DISPLAY-WS} \\ \text{DISPLAY} \\ \text{INDEX} \end{array} \right\} \right]$

$\left[ [ \text{SIGN IS} ] \left\{ \begin{array}{l} \text{LEADING} \\ \text{TRAILING} \end{array} \right\} [ \text{SEPARATE CHARACTER} ] \right]$

$\left[ \left\{ \begin{array}{l} \text{SYNCHRONIZED} \\ \text{SYNC} \end{array} \right\} \left[ \begin{array}{l} \text{LEFT} \\ \text{RIGHT} \end{array} \right] \right]$

$\left[ \left\{ \begin{array}{l} \text{JUSTIFIED} \\ \text{JUST} \end{array} \right\} \text{ RIGHT} \right]$

$[ \text{BLANK WHEN ZERO} ]$

$\left[ \text{VALUE IS} \left\{ \begin{array}{l} \text{literal} \\ \text{user-figurative-constant} \end{array} \right\} \right]$

$[ \text{OCCURS integer-1 TIMES} \left\{ \begin{array}{l} \text{ASCENDING} \\ \text{DESCENDING} \end{array} \right\} \text{ KEY IS } \{ \text{data-name-3} \} \dots ]$

$[ \text{INDEXED BY } \{ \text{index-name-1} \} \dots ]$

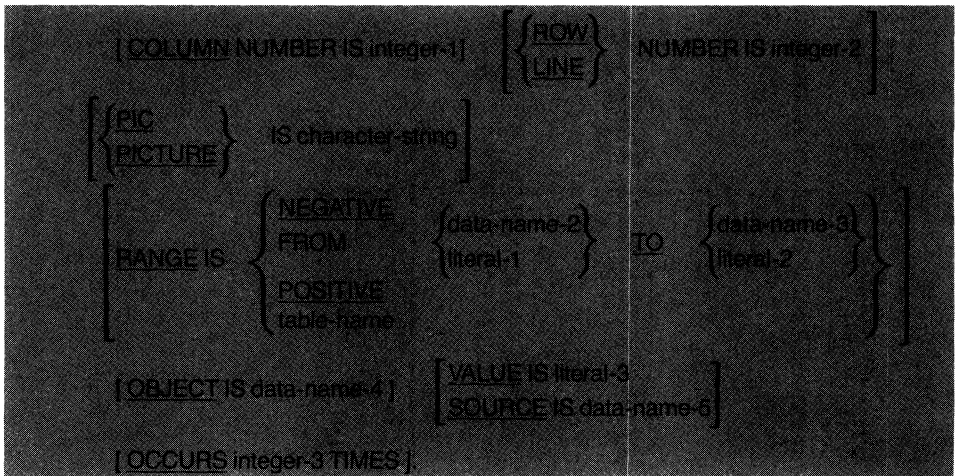
#### Format 2

88 condition-name  $\left\{ \begin{array}{l} \text{VALUE IS} \\ \text{VALUES ARE} \end{array} \right\} \left\{ \text{literal-1} \left[ \left\{ \begin{array}{l} \text{THROUGH} \\ \text{THRU} \end{array} \right\} \text{literal-2} \right] \right\} \dots$

#### Record Description Entry for Workstation Screen:

01 record-name [ USAGE IS ] DISPLAY-WS

level-number  $\left\{ \begin{array}{l} \text{data-name-1} \\ \text{FILLER} \end{array} \right\}$



### General Format for Procedure Division

`PROCEDURE DIVISION [ USING data-name-1 [ data-name-2 ] ... ]`.  
 procedure division body.

### Procedure Division Body:

#### Format 1

`[ DECLARATIVES.`

`{ section-name SECTION [ segment-number ]. declarative sentence.`  
`[ paragraph-name. [ sentence ] ... ] ... } ...`

`END DECLARATIVES.]`

`{ section-name SECTION [ segment-number ].`  
`[ paragraph-name. [ sentence ] ... ] ... } ...`

#### Format 2

`[ paragraph-name. [ sentence ] ... ] ...`

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## VS COBOL Language Syntax

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### Declarative Sentence:

#### USE STATEMENT

##### Format 1

USE AFTER STANDARD { EXCEPTION  
ERROR } PROCEDURE ON  
{ file-name-1 [ file-name-2 ] ...  
INPUT  
OUTPUT  
I-O  
SHARED  
EXTEND }

##### Format 2

USE FOR DEBUGGING ON { procedure-name-1 [ procedure-name-2 ] ... }  
ALL PROCEDURES

##### Format 3

USE AFTER DEADLOCK.

#### VS COBOL STATEMENT FORMATS

#### ACCEPT STATEMENT

##### Format 1

ACCEPT identifier-1 [ identifier-2 ] ...

##### Format 2

ACCEPT identifier FROM { DATE  
DAY  
TIME }

#### ADD STATEMENT

##### Format 1

ADD { identifier-1 } [ identifier-2 ] ... TO identifier-m [ ROUNDED ]  
[ ON SIZE ERROR imperative-statement ]



**Format 2**

ADD     $\left\{ \begin{array}{c} \text{identifier-1} \\ \text{literal-1} \end{array} \right\} \left\{ \begin{array}{c} \text{identifier-2} \\ \text{literal-2} \end{array} \right\} \left[ \begin{array}{c} \text{identifier-3} \\ \text{literal-3} \end{array} \right] \dots$   
           GIVING identifier-m [ ROUNDED ]  
           [ ON SIZE ERROR imperative-statement ]

**Format 3**

ADD     $\left\{ \begin{array}{c} \text{CORRESPONDING} \\ \text{CORR} \end{array} \right\}$  identifier-1 TO identifier-2 [ ROUNDED ]  
           [ ON SIZE ERROR imperative-statement ]

**ALTER STATEMENT**

ALTER { procedure-name-1 TO [ PROCEED TO ] procedure-name-2 } ...

**CALL STATEMENT**

CALL literal-1 [ USING identifier-1 [ identifier-2 ] ... ]

**CLOSE STATEMENT**

**Consecutive File Organization**

CLOSE file-name-1  $\left[ \begin{array}{c} \left\{ \begin{array}{c} \text{REEL} \\ \text{UNIT} \end{array} \right\} \left[ \begin{array}{c} \text{WITH NO REWIND} \\ \text{FOR REMOVAL} \end{array} \right] \\ \text{WITH} \left\{ \begin{array}{c} \text{NO REWIND} \\ \text{LOCK} \end{array} \right\} \end{array} \right]$

$\left[ \begin{array}{c} \text{file-name-2} \left\{ \begin{array}{c} \text{REEL} \\ \text{UNIT} \end{array} \right\} \left[ \begin{array}{c} \text{WITH NO REWIND} \\ \text{FOR REMOVAL} \end{array} \right] \\ \text{WITH} \left\{ \begin{array}{c} \text{NO REWIND} \\ \text{LOCK} \end{array} \right\} \end{array} \right]$

**Indexed and Relative File Organization**

CLOSE { file-name-1 [ WITH LOCK ] } ...

**COMPUTE STATEMENT**

COMPUTE identifier-1 [ ROUNDED ] = arithmetic-expression  
           [ ON SIZE ERROR imperative-statement ]

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## VS COBOL Statement Formats

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### COPY STATEMENT

$$\underline{\text{COPY}} \left\{ \begin{array}{l} \text{file-name} \\ \text{literal-1} \end{array} \right\} \left[ \left\{ \begin{array}{l} \underline{\text{IN}} \\ \underline{\text{OF}} \end{array} \right\} \left\{ \begin{array}{l} \text{library-name} \\ \text{literal-2} \end{array} \right\} \left[ \left\{ \begin{array}{l} \underline{\text{OF}} \\ \underline{\text{IN}} \\ \underline{\text{ON}} \end{array} \right\} \left\{ \begin{array}{l} \text{volume-name} \\ \text{literal-3} \end{array} \right\} \right] \right]$$

### DELETE STATEMENT

DELETE file-name RECORD [ INVALID KEY imperative-statement ]

### DISPLAY STATEMENT

DISPLAY  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\} \left[ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right] \dots$

### DISPLAY AND READ STATEMENT

DISPLAY AND READ [ALTERED] record-name ON file-name

$$\left[ \begin{array}{l} \left[ \underline{\text{ONLY}} \right] \left\{ \begin{array}{l} \text{PFKEY} \\ \text{PFKEYS} \end{array} \right\} \left\{ \begin{array}{l} \text{identifier-1} \\ \text{integer-1} \end{array} \right\} \left[ \begin{array}{l} \text{identifier-2} \\ \text{integer-2} \end{array} \right] \dots \\ \left[ \underline{\text{ON}} \right] \left\{ \begin{array}{l} \text{PFKEY} \\ \text{PFKEYS} \end{array} \right\} \left\{ \begin{array}{l} \text{identifier-3} \\ \text{integer-3} \end{array} \right\} \left[ \begin{array}{l} \text{identifier-4} \\ \text{integer-4} \end{array} \right] \dots \text{imperative-statement-1} \end{array} \right] \\ \left[ \underline{\text{NO-MOD}} \text{ imperative-statement-2} \right]$$

### DIVIDE STATEMENT

#### Format 1

DIVIDE  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\} \quad \underline{\text{INTO}} \quad \text{identifier-2} \left[ \underline{\text{ROUNDED}} \right]$   
[ ON SIZE ERROR imperative-statement ]

#### Format 2

DIVIDE  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\} \quad \underline{\text{INTO}} \quad \left\{ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right\}$   
GIVING identifier-3 [ ROUNDED ]  
[ ON SIZE ERROR imperative-statement ]

**Format 3**

DIVIDE     $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\}$     BY     $\left\{ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right\}$   
GIVING    identifier-3 [ ROUNDED ]  
  
[ ON SIZE ERROR imperative-statement ]

**Format 4**

DIVIDE     $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\}$     INTO     $\left\{ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right\}$   
GIVING    identifier-3 [ ROUNDED ]  
  
REMAINDER identifier-4 [ ON SIZE ERROR imperative-statement ]

**Format 5**

DIVIDE     $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\}$     BY     $\left\{ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right\}$   
GIVING    identifier-3 [ ROUNDED ]  
  
REMAINDER identifier-4 [ ON SIZE ERROR imperative-statement ]

**ENTER STATEMENT**

ENTER language-name [ routine-name ].

**EXIT STATEMENT**

EXIT.

**EXIT PROGRAM STATEMENT**

EXIT PROGRAM.

**FREE STATEMENT**

FREE ALL [ ON ERROR imperative-statement ]

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## VS COBOL Statement Formats

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### GO TO STATEMENT

#### Format 1

GO TO [ procedure-name-1 ]

#### Format 2

GO TO procedure-name-1 [ procedure-name-2 ] . . . procedure-name-n  
DEPENDING ON identifier

### HOLD STATEMENT

#### Format 1

HOLD EXTENSION RIGHTS { TIMEOUT OF { data-name-1 } { SECOND } { SECONDS } }  
[ HOLDER ID IN data-name-2 ]  
{ imperative-statement-1 }  
{ NEXT SENTENCE }  
[ ON ERROR imperative-statement-2 ]

#### Format 2

HOLD LIST  
{ RECORDS OF file-name-1 } { FOR { RETRIEVAL } { UPDATE } }  
{ FOR { RETRIEVAL } { UPDATE } keyphrase }  
{ TIMEOUT OF { data-name-1 } { SECOND } { SECONDS } }  
[ HOLDER ID IN data-name-2 ]  
{ imperative-statement }  
{ NEXT SENTENCE }

keyphrase

WITH KEYS { INITIAL { data-name-3 } { literal-1 } } { CHARACTERS OF { data-name-4 } { literal-2 } }

OPTION:

## IF STATEMENT

### Format 1

IF condition THEN { statement-1  
NEXT SENTENCE }

### Format 2

IF condition THEN { statement-1  
NEXT SENTENCE }  
ELSE { statement-2  
NEXT SENTENCE }

### Format 3

IF FAC OF display-item { IS =  
IS EQUAL TO  
IS NOT EQUAL TO  
IS NOT = } data-name  
  
THEN { statement-1  
NEXT SENTENCE }  
[ ELSE { statement-2  
NEXT SENTENCE } ]

### Format 4

IF FAC OF display-item ALTERED THEN { statement-1  
NEXT SENTENCE }  
[ ELSE { statement-2  
NEXT SENTENCE } ]

### Format 5

IF figurative-constant { IN  
OF } { identifier  
FAC OF display-item } IS ( NOT ) { ON  
OFF }  
  
THEN { statement-1  
NEXT SENTENCE }  
[ ELSE { statement-2  
NEXT SENTENCE } ]

**INSPECT STATEMENT**
**Format 1**
INSPECT identifier-1 TALLYING

$$\left\{ \text{identifier-2 FOR } \left\{ \left\{ \begin{array}{l} \text{ALL} \\ \text{LEADING} \end{array} \right\} \begin{array}{l} \text{identifier-3} \\ \text{literal-1} \end{array} \right\} \right. \\ \left. \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{ INITIAL } \begin{array}{l} \text{identifier-4} \\ \text{literal-2} \end{array} \right] \right\} \dots \dots \dots \left. \right\}$$
**Format 2**
INSPECT identifier-1 REPLACING

$$\left\{ \begin{array}{l} \text{CHARACTERS BY } \begin{array}{l} \text{identifier-6} \\ \text{literal-4} \end{array} \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{ INITIAL } \begin{array}{l} \text{identifier-7} \\ \text{literal-5} \end{array} \end{array} \right. \\ \left. \left\{ \left\{ \begin{array}{l} \text{ALL} \\ \text{LEADING} \\ \text{FIRST} \end{array} \right\} \begin{array}{l} \text{identifier-5} \\ \text{literal-3} \end{array} \text{ BY } \begin{array}{l} \text{identifier-6} \\ \text{literal-4} \end{array} \right. \right. \\ \left. \left. \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{ INITIAL } \begin{array}{l} \text{identifier-7} \\ \text{literal-5} \end{array} \right] \right\} \dots \dots \dots \right\}$$
**Format 3**
INSPECT identifier-1 TALLYING

$$\left\{ \text{identifier-2 FOR } \left\{ \left\{ \begin{array}{l} \text{ALL} \\ \text{LEADING} \end{array} \right\} \begin{array}{l} \text{identifier-3} \\ \text{literal-1} \end{array} \right\} \right. \\ \left. \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{ INITIAL } \begin{array}{l} \text{identifier-4} \\ \text{literal-2} \end{array} \right] \right\} \dots \dots \dots \left. \right\}$$

REPLACING

$$\left\{ \begin{array}{l} \text{CHARACTERS BY } \left\{ \begin{array}{l} \text{identifier-6} \\ \text{literal-4} \end{array} \right\} \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{INITIAL } \left\{ \begin{array}{l} \text{identifier-7} \\ \text{literal-5} \end{array} \right\} \\ \left\{ \begin{array}{l} \text{ALL} \\ \text{LEADING} \\ \text{FIRST} \end{array} \right\} \left\{ \begin{array}{l} \text{identifier-5} \\ \text{literal-3} \end{array} \right\} \text{ BY } \left\{ \begin{array}{l} \text{identifier-6} \\ \text{literal-4} \end{array} \right\} \\ \left[ \begin{array}{l} \text{BEFORE} \\ \text{AFTER} \end{array} \right] \text{INITIAL } \left\{ \begin{array}{l} \text{identifier-7} \\ \text{literal-5} \end{array} \right\} \end{array} \right\} \dots \dots$$

**MERGE STATEMENT**

MERGE file-name-1 ON  $\left\{ \begin{array}{l} \text{ASCENDING} \\ \text{DESCENDING} \end{array} \right\}$  KEY data-name-1 [ data-name-2 ] ...

$\left[ \text{ON } \left\{ \begin{array}{l} \text{ASCENDING} \\ \text{DESCENDING} \end{array} \right\} \text{ KEY data-name-3 [ data-name-4 ] } \dots \right] \dots$

[ COLLATING SEQUENCE IS alphabet-name ]

USING file-name-2 [ file-name-3 ] ...

$\left\{ \begin{array}{l} \text{OUTPUT PROCEDURE IS section-name-1 } \left[ \begin{array}{l} \text{THROUGH} \\ \text{THRU} \end{array} \right] \text{ section-name-2} \\ \text{GIVING file-name-4} \end{array} \right\}$

**MOVE STATEMENT**

**Format 1**

MOVE  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal} \end{array} \right\}$  TO identifier-2 [ identifier-3 ] ...

**Format 2**

MOVE WITH CONVERSION identifier-1 TO identifier-2  
[ ON ERROR imperative-statement ]

**Format 3**

MOVE figurative-constant TO FAC OF data-name

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## VS COBOL Statement Formats

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### Format 4

MOVE PAC OF data-name-1 TO data-name-2

### Format 5

MOVE data-name TO ORDER-AREA OF record-name

### Format 6

MOVE ORDER-AREA OF record-name TO data-name

### Format 7

MOVE  $\left\{ \begin{array}{l} \text{CORRESPONDING} \\ \text{CORR} \end{array} \right\}$  identifier-1 TO identifier-2

## MULTIPLY STATEMENT

### Format 1

MULTIPLY  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\}$  BY identifier-2 [ ROUNDED ]  
[ ON SIZE ERROR imperative-statement ]

### Format 2

MULTIPLY  $\left\{ \begin{array}{l} \text{identifier-1} \\ \text{literal-1} \end{array} \right\}$  BY  $\left\{ \begin{array}{l} \text{identifier-2} \\ \text{literal-2} \end{array} \right\}$   
GIVING identifier-3 [ ROUNDED ]  
[ ON SIZE ERROR imperative-statement ]

## OPEN STATEMENT

### Consecutive File Organization

OPEN  $\left\{ \begin{array}{l} \text{INPUT} \quad \{ \text{file-name-1} \} \dots \\ \text{OUTPUT} \quad \{ \text{file-name-2} \} \dots \\ \text{I-O} \quad \{ \text{file-name-3} \} \dots \\ \text{SHARED} \quad \{ \text{file-name-4} \} \dots \\ \text{EXTEND} \quad \{ \text{file-name-5} \} \dots \end{array} \right\} \dots$

### Indexed File Organization

OPEN  $\left\{ \begin{array}{l} \text{INPUT} \quad \{ \text{file-name-1} \} \dots \\ \text{OUTPUT} \quad \{ \text{file-name-2} \} \dots \\ \text{I-O} \quad \{ \text{file-name-3} \} \dots \\ \text{SHARED} \quad \{ \text{file-name-4} \} \dots \end{array} \right\} \dots$



### Relative File Organization

$$\text{OPEN} \left\{ \begin{array}{ll} \text{INPUT} & \{ \text{file-name-1} \} \dots \\ \text{OUTPUT} & \{ \text{file-name-2} \} \dots \\ \text{I-O} & \{ \text{file-name-3} \} \dots \\ \text{EXTEND} & \{ \text{file-name-4} \} \dots \end{array} \right\} \dots$$

### PERFORM STATEMENT

#### Format 1

$$\text{PERFORM procedure-name-1} \left[ \left\{ \begin{array}{l} \text{THRU} \\ \text{THROUGH} \end{array} \right\} \text{procedure-name-2} \right]$$

#### Format 2

$$\text{PERFORM procedure-name-1} \left[ \left\{ \begin{array}{l} \text{THRU} \\ \text{THROUGH} \end{array} \right\} \text{procedure-name-2} \right]$$

$$\left\{ \begin{array}{l} \text{identifier-1} \\ \text{integer-1} \end{array} \right\} \text{TIMES}$$

#### Format 3

$$\text{PERFORM procedure-name-1} \left[ \left\{ \begin{array}{l} \text{THRU} \\ \text{THROUGH} \end{array} \right\} \text{procedure-name-2} \right]$$

$$\text{UNTIL condition-1}$$

#### Format 4

$$\text{PERFORM procedure-name-1} \left[ \left\{ \begin{array}{l} \text{THRU} \\ \text{THROUGH} \end{array} \right\} \text{procedure-name-2} \right]$$

$$\text{VARYING} \left\{ \begin{array}{l} \text{identifier-2} \\ \text{index-name-1} \end{array} \right\} \text{FROM} \left\{ \begin{array}{l} \text{identifier-3} \\ \text{index-name-2} \\ \text{literal-1} \end{array} \right\}$$

$$\text{BY} \left\{ \begin{array}{l} \text{identifier-4} \\ \text{literal-2} \end{array} \right\} \text{UNTIL condition-1}$$

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## VS COBOL Statement Formats

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### READ STATEMENT

#### Consecutive File Organization

##### Format 1

READ file-name [ NEXT ] RECORD **WITH HOLD** [ INTO identifier ]  
[ AT END imperative-statement ]

##### Format 2

READ file-name [ NEXT ] RECORD **WITH HOLD  
MODIFIABLE  
ALTERED** [ INTO identifier ]  
 $\left[ \begin{array}{l} \{ \text{INVALID KEY} \} \\ \{ \text{AT END} \} \end{array} \right. \text{imperative-statement} ]$

#### Indexed File Organization

##### Format 1

READ file-name [ NEXT ] RECORD **WITH HOLD** [ INTO identifier ]

$\left[ \begin{array}{l} \text{TIMEOUT OF } \left\{ \begin{array}{l} \text{data-name-1} \\ \text{integer} \end{array} \right\} \left[ \begin{array}{l} \text{SECOND} \\ \text{SECONDS} \end{array} \right] \\ \left[ \text{HOLDER-ID IN data-name-2} \right] \\ \left\{ \begin{array}{l} \text{imperative-statement} \\ \text{NEXT SENTENCE} \end{array} \right\} \end{array} \right]$

[ AT END imperative-statement ]

##### Format 2

READ file-name RECORD **WITH HOLD** [ INTO identifier ]

[ KEY IS data-name-3 ]

$\left[ \begin{array}{l} \text{TIMEOUT OF } \left\{ \begin{array}{l} \text{data-name-1} \\ \text{integer} \end{array} \right\} \left[ \begin{array}{l} \text{SECOND} \\ \text{SECONDS} \end{array} \right] \\ \left[ \text{HOLDER-ID IN data-name-2} \right] \\ \left\{ \begin{array}{l} \text{imperative-statement} \\ \text{NEXT SENTENCE} \end{array} \right\} \\ \left[ \text{INVALID KEY imperative-statement} \right] \end{array} \right]$

### Relative File Organization

#### Format 1

READ file-name [ NEXT ] RECORD [ WITH HOLD ] [ INTO identifier ]  
[ AT END imperative-statement ]

#### Format 2

READ file-name RECORD [ WITH HOLD ] [ INTO identifier ]  
[ INVALID KEY imperative-statement ]

### READY TRACE STATEMENT

READY TRACE

### RELEASE STATEMENT

RELEASE record-name [ FROM identifier ]

### RESET TRACE STATEMENT

RESET TRACE

### RETURN STATEMENT

RETURN file-name RECORD [ INTO identifier ] AT END imperative-statement

### REWRITE STATEMENT

#### Consecutive File Organization

#### Format 1

REWRITE record-name [ FROM identifier ]

#### Format 2

REWRITE record-name [ FROM identifier ] AFTER

ALARM

SETTING CURSOR COLUMN

{ identifier-1  
integer-1 }

{ ROW  
LINE }

{ identifier-2  
integer-2 }

ROLL DOWN

ROLL UP

ERASE PROTECT

ERASE MODIFY

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## VS COBOL Statement Formats

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### Indexed and Relative File Organization

REWRITE record-name [ FROM identifier ]

[ INVALID KEY imperative-statement ]

### ROLL BACK STATEMENT

ROLLBACK [ ON ERROR imperative-statement ]

### SEARCH STATEMENT

#### Format 1

$$\begin{array}{c} \text{SEARCH identifier-1} \left[ \text{VARYING} \left\{ \begin{array}{l} \text{identifier-2} \\ \text{index-name-1} \end{array} \right\} \right] \\ \\ \left[ \text{AT END imperative-statement-1} \right] \\ \\ \left[ \begin{array}{l} \text{WHEN condition-1} \left\{ \begin{array}{l} \text{imperative-statement-2} \\ \text{NEXT SENTENCE} \end{array} \right\} \\ \text{WHEN condition-2} \left\{ \begin{array}{l} \text{imperative-statement-3} \\ \text{NEXT SENTENCE} \end{array} \right\} \end{array} \right] \dots \end{array}$$

#### Format 2

SEARCH ALL identifier-1 [ AT END imperative-statement-1 ]

$$\begin{array}{c} \text{WHEN} \left\{ \begin{array}{l} \text{data-name-1} \left\{ \begin{array}{l} \text{IS EQUAL TO} \\ \text{IS =} \end{array} \right\} \left\{ \begin{array}{l} \text{identifier-3} \\ \text{literal-1} \\ \text{arithmetic-expression-1} \end{array} \right\} \\ \text{condition-name-1} \end{array} \right\} \\ \\ \left[ \text{AND} \left\{ \begin{array}{l} \text{data-name-2} \left\{ \begin{array}{l} \text{IS EQUAL TO} \\ \text{IS =} \end{array} \right\} \\ \text{condition-name-2} \end{array} \right\} \right. \\ \\ \left. \left\{ \begin{array}{l} \text{identifier-4} \\ \text{literal-2} \\ \text{arithmetic-expression-2} \end{array} \right\} \right\} \dots \end{array}$$

$$\left\{ \begin{array}{l} \text{imperative-statement-2} \\ \text{NEXT SENTENCE} \end{array} \right\}$$

## SET STATEMENT

### Format 1

SET { identifier-1 [ identifier-2 ] ... } TO { identifier-3  
index-name-1 [ index-name-2 ] ... } { index-name-3  
integer-1 }

### Format 2

SET index-name-4 [ index-name-5 ] ... { UP BY  
DOWN BY } { identifier-4  
integer-2 }

### Format 3

SET figurative-constant { IN FAC OF  
OF } { display-item  
identifier-5 } { ON  
OFF }

## SORT STATEMENT

SORT file-name-1 ON { ASCENDING  
DESCENDING } KEY { data-name-1 } ...  
[ ON { ASCENDING  
DESCENDING } KEY { data-name-2 } ... ] ...

[ WITH DUPLICATES IN ORDER ]

[ COLLATING SEQUENCE IS alphabet-name ]

{ INPUT PROCEDURE IS section-name-1 [ { THROUGH  
THRU } section-name-2 ] }  
{ USING file-name-2 [ file-name-3 ] ... }  
{ OUTPUT PROCEDURE IS section-name-3 [ { THROUGH  
THRU } section-name-4 ] }  
{ GIVING file-name-4 }

## START STATEMENT

### Consecutive File Organization

START file-name

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## VS COBOL Statement Formats

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### Indexed File Organization

|                                             |   |                           |   |                                                                                                            |   |             |   |
|---------------------------------------------|---|---------------------------|---|------------------------------------------------------------------------------------------------------------|---|-------------|---|
| <u>START</u> file-name                      | [ | <u>KEY</u> [ data-name-1] | { | IS <u>EQUAL TO</u><br>IS =<br>IS <u>GREATER THAN</u><br>IS ><br>IS <u>NOT LESS THAN</u><br>IS <u>NOT</u> < | } | data-name-2 | ] |
| [ <u>INVALID KEY</u> imperative-statement ] |   |                           |   |                                                                                                            |   |             |   |

### Relative File Organization

|                                             |   |            |   |                                                                                                                                                                                                                                                                                                                                                                                                                |   |           |   |
|---------------------------------------------|---|------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------|---|
| <u>START</u> file-name                      | [ | <u>KEY</u> | { | IS <u>EQUAL TO</u><br>IS =<br>IS <u>GREATER THAN</u><br>IS ><br><div style="background-color: black; color: black;">IS LESS THAN</div><br><div style="background-color: black; color: black;">IS &lt;</div><br>IS <u>NOT LESS THAN</u><br>IS <u>NOT</u> <<br><div style="background-color: black; color: black;">IS NOT GREATER THAN</div><br><div style="background-color: black; color: black;">IS NOT</div> | } | data-name | ] |
| [ <u>INVALID KEY</u> imperative-statement ] |   |            |   |                                                                                                                                                                                                                                                                                                                                                                                                                |   |           |   |

### STOP STATEMENT

STOP    { RUN }  
              { literal }

### STRING STATEMENT

STRING    { { identifier-1 }  
                  { literal-1 } }    ...    DELIMITED BY    { identifier-2 }  
                                                                          { literal-2 }  
                                                                          { SIZE } }    ...

INTO identifier-3  
 [ WITH POINTER identifier-4 ]  
 [ ON OVERFLOW imperative-statement ]



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## VS COBOL Statement Formats

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### Indexed File Organization

WRITE record-name [ FROM identifier ]

$$\left[ \begin{array}{c} \text{TIMEOUT OF } \left\{ \begin{array}{c} \text{data-name-1} \\ \text{integer} \end{array} \right\} \left[ \begin{array}{c} \text{SECOND} \\ \text{SECONDS} \end{array} \right] \\ \text{[ HOLDER-ID IN data-name-2 ]} \\ \left\{ \begin{array}{c} \text{imperative-statement} \\ \text{NEXT SENTENCE} \end{array} \right\} \end{array} \right]$$

[ INVALID KEY imperative-statement ]

### Relative File Organization

WRITE record-name [ FROM identifier ]

[ INVALID KEY imperative-statement ]

### GENERAL FORMATS FOR CONDITIONS

#### Condition:

Simple condition

NOT Simple condition

Combined condition

NOT Combined condition

#### Simple conditions:

Class, Condition-name, Figurative-constant, Modified-data-tag, Relation, Sign, and Switch-status.

#### Combined condition:

condition-1  $\left\{ \begin{array}{c} \text{AND} \\ \text{OR} \end{array} \right\}$  condition-2

#### Relational operator:

$$\left\{ \begin{array}{l} \text{IS [ NOT ] GREATER THAN} \\ \text{IS [ NOT ] LESS THAN} \\ \text{IS [ NOT ] EQUAL TO} \\ \text{IS [ NOT ] <} \\ \text{IS [ NOT ] >} \\ \text{IS [ NOT ] =} \end{array} \right\}$$

#### Class condition:

identifier IS [ NOT ]  $\left\{ \begin{array}{c} \text{NUMERIC} \\ \text{ALPHABETIC} \end{array} \right\}$



**Condition-name and Switch-status condition:**

condition-name

**Figurative-constant condition:**

figurative-constant  $\left\{ \begin{array}{c} \underline{\text{IN}} \\ \underline{\text{OF}} \end{array} \right\} \left\{ \begin{array}{c} \text{identifier} \\ \underline{\text{FAC OF}} \text{ display-item} \end{array} \right\} \text{ IS } [ \underline{\text{NOT}} ] \left\{ \begin{array}{c} \underline{\text{ON}} \\ \underline{\text{OFF}} \end{array} \right\}$

**Modified-data-tag condition:**

FAC OF display-item ALTERED

**Relation condition:**

$\left\{ \begin{array}{c} \text{identifier-1} \\ \text{literal-1} \\ \text{arithmetic-expression-1} \end{array} \right\} [ \text{relational-operator} ] \left\{ \begin{array}{c} \text{identifier-2} \\ \text{literal-2} \\ \text{arithmetic-expression-2} \end{array} \right\}$

**Sign condition:**

arithmetic-expression IS [ NOT ]  $\left\{ \begin{array}{c} \underline{\text{POSITIVE}} \\ \underline{\text{NEGATIVE}} \\ \underline{\text{ZERO}} \end{array} \right\}$

**Abbreviated combined relation condition:**

relation-condition  $\left\{ \begin{array}{c} \underline{\text{AND}} \\ \underline{\text{OR}} \end{array} \right\} [ \underline{\text{NOT}} ] [ \text{relational-operator} ] \text{ object } \left\{ \dots \right\}$

**MISCELLANEOUS FORMATS**

**QUALIFICATION**

**Format 1**

$\left\{ \begin{array}{c} \text{data-name-1} \\ \text{condition-name} \end{array} \right\} \left[ \left\{ \begin{array}{c} \underline{\text{OF}} \\ \underline{\text{IN}} \end{array} \right\} \text{ data-name-2} \right] \dots$

**Format 2**

paragraph-name  $\left[ \left\{ \begin{array}{c} \underline{\text{OF}} \\ \underline{\text{IN}} \end{array} \right\} \text{ section-name} \right]$

**Format 3**

text-name  $\left[ \left\{ \begin{array}{c} \underline{\text{OF}} \\ \underline{\text{IN}} \end{array} \right\} \text{ library-name} \left[ \left\{ \begin{array}{c} \underline{\text{OF}} \\ \underline{\text{IN}} \\ \underline{\text{ON}} \end{array} \right\} \text{ volume-name} \right] \right]$

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## Miscellaneous Formats

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### SUBSCRIPTING

$$\left\{ \begin{array}{l} \text{data-name} \\ \text{condition-name} \end{array} \right\} \quad ( \text{subscript-1} [ \text{subscript-2} [ \text{subscript-3} ] ] )$$

### INDEXING

$$\left\{ \begin{array}{l} \text{data-name} \\ \text{condition-name} \end{array} \right\} \quad \left( \left\{ \begin{array}{l} \text{index-name-1} [ \pm \text{literal-2} ] \\ \text{literal-1} \end{array} \right\} \right. \\ \left[ \left\{ \begin{array}{l} \text{index-name-2} [ \pm \text{literal-4} ] \\ \text{literal-3} \end{array} \right\} \right. \\ \left. \left[ \left\{ \begin{array}{l} \text{index-name-3} [ \pm \text{literal-6} ] \\ \text{literal-5} \end{array} \right\} \right] \right] \right)$$

### IDENTIFIER

#### Format 1

$$\text{data-name-1} \left[ \left\{ \begin{array}{c} \text{OF} \\ \text{IN} \end{array} \right\} \text{data-name-2} \right] \dots [ ( \text{subscript-1} [ \text{subscript-2} [ \text{subscript-3} ] ] ) ]$$

#### Format 2

$$\text{data-name-1} \left[ \left\{ \begin{array}{c} \text{OF} \\ \text{IN} \end{array} \right\} \text{data-name-2} \right] \dots \\ \left[ \left( \left\{ \begin{array}{l} \text{index-name-1} [ \pm \text{literal-2} ] \\ \text{literal-1} \end{array} \right\} \right. \right. \\ \left[ \left\{ \begin{array}{l} \text{index-name-2} [ \pm \text{literal-4} ] \\ \text{literal-3} \end{array} \right\} \right. \\ \left. \left[ \left\{ \begin{array}{l} \text{index-name-3} [ \pm \text{literal-6} ] \\ \text{literal-5} \end{array} \right\} \right] \right] \right) \right]$$

**GLOSSARY**

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alphabet-Name         | A user-defined word, in the SPECIAL-NAMES paragraph of the Environment Division, that assigns a name to a specific character set and/or collating sequence.                                                                                                                                                                                                                                                                                                                       |
| Area A                | This area occupies character positions 8 through 11 on a line of a COBOL source program. It is reserved for the beginning of division headers, section names, paragraph names, level indicators, and certain level numbers.                                                                                                                                                                                                                                                       |
| Area B                | This area occupies character positions 12 through 72. It contains all remaining source code in a COBOL source program.                                                                                                                                                                                                                                                                                                                                                            |
| Arithmetic Expression | An identifier of a numeric elementary item, a numeric literal, such identifiers and literals separated by arithmetic operators, two arithmetic expressions separated by an arithmetic operator, or an arithmetic expression enclosed in parentheses.                                                                                                                                                                                                                              |
| Character-String      | A sequence of contiguous characters which form a COBOL word, a literal, a PICTURE character-string, or a comment-entry.                                                                                                                                                                                                                                                                                                                                                           |
| COBOL Word            | A character-string of not more than 30 characters which forms a user-defined word, a system-name, or a reserved word.                                                                                                                                                                                                                                                                                                                                                             |
| Comment-Entry         | An entry in the Identification Division that may be any combination of characters from the computer's character set.                                                                                                                                                                                                                                                                                                                                                              |
| Comment Line          | A source program line represented by an asterisk (*) in the indicator area of the line and any characters from the computer's character set in area A and area B of the line. The comment line serves only for documentation in a program. A special form of comment line represented by a slant (/) in the indicator area of the line and any characters from the computer's character set in area A and area B of that line causes page ejection prior to printing the comment. |
| Condition             | When the term 'condition' (condition-1, condition-2, . . .) appears in these language specifications in or in reference to 'condition' (condition-1, condition-2, . . .) of a general format, it is a conditional expression consisting of either a simple condition optionally parenthesized, or a combined condition consisting of the syntactically correct combination of simple conditions, logical operators, and parentheses, for which a truth value can be determined.   |

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## Glossary

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|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition-Name       | A user-defined word that assigns a name to a subset of values that a conditional variable may assume; or a user-defined word assigned to a status of an implementor-defined switch or device. When 'condition-name' is used in the general formats, it represents a unique data item reference consisting of a syntactically correct combination of a condition-name, together with qualifiers and subscripts, as required for uniqueness of reference. |
| Data Item            | A unit of data (excluding literals) defined by the COBOL program.                                                                                                                                                                                                                                                                                                                                                                                       |
| Data-Name            | A user-defined word that names a data item described in a data description entry. When used in the general formats, 'data-name' represents a word which must not be subscripted or qualified unless specifically permitted by the rules of the format.                                                                                                                                                                                                  |
| Declarative Sentence | A compiler directing sentence consisting of a single USE statement terminated by the separator period.                                                                                                                                                                                                                                                                                                                                                  |
| Display-Item         | A data-name that is defined within a Record Description Entry for a Workstation Screen.                                                                                                                                                                                                                                                                                                                                                                 |
| Figurative Constant  | Reserved words that are used to name and reference specific constant values. Specifically, they are zero(s or es), space(s), high-value(s), low-value(s), and quote(s).                                                                                                                                                                                                                                                                                 |
| File-Name            | A user-defined word that names a file described in a file description entry or a sort-merge file description entry within the File Section of the Data Division.                                                                                                                                                                                                                                                                                        |
| Hexadecimal Value    | A hexadecimal value can be either two or four hexadecimal characters. The hexadecimal value must be enclosed in quotation marks. A hexadecimal character is any of the characters, '0', '1', . . . , '9', or 'A', . . . , 'F'.                                                                                                                                                                                                                          |
| Identifier           | A syntactically correct combination of a data-name, with its qualifiers or subscripts, as required for uniqueness of reference, that names a data item. The rules for 'identifier' associated with the general formats may, however, specifically prohibit qualification or subscripting.                                                                                                                                                               |
| Imperative Statement | A statement that begins with an imperative verb and specifies an unconditional action to be taken. An imperative statement may consist of a sequence of imperative statements.                                                                                                                                                                                                                                                                          |
| Implementor-Name     | A system-name that refers to a particular feature available on that implementor's computing system.                                                                                                                                                                                                                                                                                                                                                     |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Index              | A computer storage area or register, the content of which represents the identification of a particular element in a table.                                                                                                                                                                                                                                                                                                                                                                                                |
| Index-Name         | A user-defined word that names an index associated with a specific table.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Indicator Area     | This area occupies column seven on a line in a COBOL source program. It is used to indicate continuation lines and comment lines.                                                                                                                                                                                                                                                                                                                                                                                          |
| Integer            | A numeric literal or a numeric data item that does not include any digit position to the right of the decimal point. When the term 'integer' appears in general formats, integer must not be a numeric data item, and must not be signed, nor zero unless explicitly allowed by the rules of that format.                                                                                                                                                                                                                  |
| Language-Name      | A system-name that specifies a particular programming language.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Level-Number       | A user-defined word, expressed as a one or two digit number, which indicates the hierarchical position of a data item or the special properties of a data description entry. Level-numbers in the range 1 through 49 indicate the position of a data item in the hierarchical structure of a logical record. Level-numbers in the range 1 through 9 may be written either as a single digit or as a zero followed by a significant digit. Level-numbers 77 and 88 identify special properties of a data description entry. |
| Library-Name       | A user-defined word that names a VS COBOL library that is to be used by the compiler for a given source program compilation.                                                                                                                                                                                                                                                                                                                                                                                               |
| Literal            | A character-string whose value is implied by the ordered set of characters comprising the string. A literal can be numeric or nonnumeric.                                                                                                                                                                                                                                                                                                                                                                                  |
| Mnemonic-Name      | A user-defined word that is associated in the Environment Division with a specific implementor-name.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Nonnumeric Literal | A literal bounded by quotation marks. The string of characters may include any character in the computer's character set.                                                                                                                                                                                                                                                                                                                                                                                                  |
| Numeric Literal    | A literal composed of one or more numeric characters that may contain either a decimal point, or an algebraic sign, or both. The decimal point must not be the rightmost character. The algebraic sign, if present, must be the leftmost character.                                                                                                                                                                                                                                                                        |

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## Glossary

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|                          |                                                                                                                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Paragraph-Name           | A user-defined word that identifies and begins a paragraph in the Procedure Division.                                                                                                                                                                                 |
| Parameter-Reference-Name | A name that identifies a specific GETPARM request.                                                                                                                                                                                                                    |
| Procedure-Name           | A user-defined word which is used to name a paragraph or section in the Procedure Division. It consists of a paragraph-name that may be qualified or a section-name.                                                                                                  |
| Program-Name             | In the Identification Division, a user-defined word that identifies a COBOL source program.                                                                                                                                                                           |
| Record Description Entry | The total set of data description entries associated with a particular record.                                                                                                                                                                                        |
| Record-Name              | A user-defined word that names a record described in a record description entry in the Data Division of a COBOL program.                                                                                                                                              |
| Routine-Name             | A user-defined word that defines a procedure written in a language other than COBOL.                                                                                                                                                                                  |
| Section-Name             | A user-defined word which names a section in the Procedure Division.                                                                                                                                                                                                  |
| Segment-Number           | A user-defined word which classifies sections in the Procedure Division for purposes of segmentation. Segment-numbers may contain only the characters '0', '1', . . . , '9'. A segment-number may be expressed either as a one or two digit number.                   |
| Sentence                 | A sequence of one or more statements, the last of which is terminated by a period.                                                                                                                                                                                    |
| Sequence Number Area     | This area occupies the character positions 1 through 6 on a line in a COBOL source program. It consists of six digits in the sequence area and labels each source program line. The EDITOR assigns these numbers automatically when the COBOL source text is entered. |
| Statement                | A syntactically valid combination of words and symbols, beginning with a verb written in a COBOL source program.                                                                                                                                                      |
| Subscript                | An integer whose value identifies a particular item in a table.                                                                                                                                                                                                       |
| System-Name              | A COBOL word which is used to communicate with the operating environment.                                                                                                                                                                                             |

|                          |                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Table-Name               | A user-defined word that references a numeric or alpha-numeric data item whose data description contains an OCCURS clause. |
| User-Figurative Constant | A user-defined word that is used to name and reference a hexadecimal character.                                            |
| Volume-Name              | A user-defined word that names a VS volume.                                                                                |

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## VS COBOL Reserved Words

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### VS COBOL RESERVED WORDS

|                |                      |                             |
|----------------|----------------------|-----------------------------|
| ACCEPT         | <b>COMPRESSED</b>    | DUPLICATES                  |
| ACCESS         | COMPUTATIONAL        | DYNAMIC                     |
| ADD            | COMPUTE              |                             |
| ADVANCING      | CONFIGURATION        | EGI                         |
| AFTER          | CONTAINS             | ELSE                        |
| <b>ALARM</b>   | CONTROL              | EMI                         |
| ALL            | CONTROLS             | ENABLE                      |
| ALPHABETIC     | <b>CONVERSION</b>    | END                         |
| ALSO           | COPY                 | END-OF-PAGE                 |
| ALTER          | CORR                 | ENTER                       |
| <b>ALTERED</b> | CORRESPONDING        | ENVIRONMENT                 |
| ALTERNATE      | COUNT                | EOP                         |
| AND            | CURRENCY             | EQUAL                       |
| ARE            | <b>CURSOR</b>        | <b>ERASE</b>                |
| AREA           |                      | ERROR                       |
| AREAS          | DATA                 | ESI                         |
| ASCENDING      | <b>DATABASE-NAME</b> | EVERY                       |
| ASSIGN         | DATE                 | EXCEPTION                   |
| AT             | DATE-COMPILED        | <b>EXCLUSIVE</b>            |
| AUTHOR         | DATE-WRITTEN         | EXIT                        |
|                | DAY                  | EXTEND                      |
| BEFORE         | DE                   | <b>EXTENSION-RIGHTS</b>     |
| <b>BINARY</b>  | <b>DEADLOCK</b>      |                             |
| BLANK          | DEBUG-CONTENTS       | <b>FAC</b>                  |
| BLOCK          | DEBUG-ITEM           | FD                          |
| <b>BLOCKS</b>  | DEBUG-LINE           | <b>FIGURATIVE-CONSTANTS</b> |
| BOTTOM         | DEBUG-NAME           | FILE                        |
| <b>BUFFER</b>  | DEBUG-SUB-1          | FILE-CONTROL                |
| BY             | DEBUG-SUB-2          | <b>FILENAME</b>             |
|                | DEBUG-SUB-3          | FILLER                      |
| CALL           | DEBUGGING            | FINAL                       |
| CANCEL         | DECIMAL-POINT        | FIRST                       |
| CD             | DECLARATIVES         | FOOTING                     |
| CF             | DELETE               | FOR                         |
| CH             | <b>DELETION</b>      | <b>FREE</b>                 |
| CHARACTER      | DELIMITED            | FROM                        |
| CHARACTERS     | DELIMITER            |                             |
| CLOCK-UNITS    | DEPENDING            | GENERATE                    |
| CLOSE          | DESCENDING           | GIVING                      |
| COBOL          | DESTINATION          | GO                          |
| CODE           | DETAIL               | GREATER                     |
| CODE-SET       | DISABLE              | GROUP                       |
| COLLATING      | DISPLAY              |                             |
| COLUMN         | <b>DISPLAYS</b>      | HEADING                     |
| COMMA          | DIVIDE               | HIGH-VALUE                  |
| COMMUNICATION  | DIVISION             | HIGH-VALUES                 |
| COMP           | DOWN                 | <b>HOLD</b>                 |



**VS COBOL RESERVED WORDS (Continued)**
**HOLDER-ID**

IDENTIFICATION

IF

IN

INDEX

INDEXED

INDICATE

INITIAL

INITIATE

INPUT

INPUT-OUTPUT

INSPECT

INSTALLATION

INTO

INVALID

**INVOKE**

I-O

I-O-CONTROL

IS

JUST

JUSTIFIED

KEY

**KEYS**

LABEL

LAST

LEADING

LEFT

LENGTH

LESS

**LIBRARY**

LIMIT

LIMITS

LINAGE

LINAGE-COUNTER

LINE

LINE-COUNTER

LINES

LINKAGE

**LIST**

LOCK

LOW-VALUE

LOW-VALUES

MEMORY

MERGE

MESSAGE

MODE

**MODIFIABLE**
**MODIFY**

MODULES

MOVE

MULTIPLE

MULTIPLY

NATIVE

NEGATIVE

NEXT

NO

**NO DISPLAY**
**NO MOD**

NOT

NUMBER

NUMERIC

**OBJECT**

OBJECT-COMPUTER

OCCURS

OF

OFF

OMITTED

ON

**ONLY**

OPEN

OPTIONAL

OR

**ORDER**
**ORDER INDEX**

ORGANIZATION

OUTPUT

OVERFLOW

PAGE

PAGE-COUNTER

PERFORM

PF

**RECY**
**RECEIVE**

PH

PIC

PICTURE

PLUS

POINTER

POSITION

POSITIVE

PRINTING

**PROB**

PROCEDURE

PROCEDURES

PROCEED

PROGRAM

PROGRAM-ID

**PROTECT**

QUEUE

QUOTE

QUOTES

RANDOM

**RANGE**

RD

READ

**READY**

RECEIVE

RECORD

RECORDS

REDEFINES

REEL

REFERENCES

RELATIVE

RELEASE

REMAINDER

REMOVAL

RENAMES

REPLACING

REPORT

REPORTING

REPORTS

RERUN

RESERVE

RESET

**RESORT**
**RETRIEVAL**

RETURN

**REVERSE CODE**

REVERSED

REWIND

REWRITE

---

## VS COBOL Reserved Words

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### VS COBOL RESERVED WORDS (Continued)

|                 |                 |        |
|-----------------|-----------------|--------|
| RF              |                 | WRITE  |
| RH              |                 |        |
| RIGHT           |                 | ZERO   |
|                 |                 | ZEROES |
|                 |                 | ZEROS  |
| ROUNDED         |                 |        |
|                 |                 |        |
| RUN             | SYMBOLIC        | +      |
|                 | SYNC            | -      |
|                 | SYNCHRONIZED    | *      |
|                 |                 | /      |
| SAME            |                 | **     |
| SD              | TABLE           |        |
| SEARCH          | TALLYING        | <      |
|                 | TAPE            | >      |
|                 | TERMINAL        | =      |
| SECTION         | TERMINATE       |        |
| SECURITY        | TEXT            |        |
| SEGMENT         | THAN            |        |
| SEGMENT-LIMIT   |                 |        |
| SELECT          | THROUGH         |        |
| SEND            | THRU            |        |
| SENTENCE        | TIME            |        |
| SEPARATE        |                 |        |
| SEQUENCE        | TIMES           |        |
| SEQUENTIAL      | TO              |        |
| SET             | TOP             |        |
|                 |                 |        |
|                 | TRAILING        |        |
| SIGN            | TYPE            |        |
| SIZE            |                 |        |
| SORT            | UNIT            |        |
| SORT-MERGE      | UNSTRING        |        |
| SOURCE          | UNTIL           |        |
| SOURCE-COMPUTER | UP              |        |
| SPACE           |                 |        |
| SPACES          | UPON            |        |
| SPECIAL-NAMES   | USAGE           |        |
| STANDARD        | USE             |        |
| STANDARD-1      | USING           |        |
| START           |                 |        |
| STATUS          | VALUE           |        |
| STOP            | VALUES          |        |
| STRING          | VARYING         |        |
| SUB-QUEUE-1     |                 |        |
| SUB-QUEUE-2     |                 |        |
| SUB-QUEUE-3     |                 |        |
| SUBTRACT        | WHEN            |        |
| SUM             | WITH            |        |
| SUPPRESS        | WORDS           |        |
|                 | WORKING-STORAGE |        |

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## Hexadecimal to Decimal Conversion

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### HEXADECIMAL TO DECIMAL CONVERSION

Use this table to convert a hexadecimal number to a decimal number. The place value of each digit in a hexadecimal number is given in columns one to six. Determine each place value and then add the decimal values. For example, to determine the decimal equivalent of hex ABC, find the decimal value of A in the third hexadecimal column (2,560), of B in the second column (176), of C in the first column (12), and take their sum (2748).

**HEXADECIMAL COLUMNS**

| Hex | Sixth<br>Dec | Fifth<br>Dec | Fourth<br>Dec | Third<br>Dec | Second<br>Dec | First<br>Dec | Hex |
|-----|--------------|--------------|---------------|--------------|---------------|--------------|-----|
| 0   | 0            | 0            | 0             | 0            | 0             | 0            | 0   |
| 1   | 1,048,576    | 65,536       | 4,096         | 256          | 16            | 1            | 1   |
| 2   | 2,097,152    | 131,072      | 8,192         | 512          | 32            | 2            | 2   |
| 3   | 3,145,728    | 196,608      | 12,288        | 768          | 48            | 3            | 3   |
| 4   | 4,194,304    | 262,144      | 16,384        | 1,024        | 64            | 4            | 4   |
| 5   | 5,242,880    | 327,680      | 20,480        | 1,280        | 80            | 5            | 5   |
| 6   | 6,291,456    | 393,216      | 24,576        | 1,536        | 96            | 6            | 6   |
| 7   | 7,340,032    | 458,752      | 28,672        | 1,792        | 112           | 7            | 7   |
| 8   | 8,388,608    | 524,288      | 32,768        | 2,048        | 128           | 8            | 8   |
| 9   | 9,437,184    | 589,824      | 36,864        | 2,304        | 144           | 9            | 9   |
| A   | 10,485,760   | 655,360      | 40,960        | 2,560        | 160           | 10           | A   |
| B   | 11,534,336   | 720,896      | 45,056        | 2,816        | 176           | 11           | B   |
| C   | 12,582,912   | 786,432      | 49,152        | 3,072        | 192           | 12           | C   |
| D   | 13,631,488   | 851,968      | 53,248        | 3,328        | 208           | 13           | D   |
| E   | 14,680,064   | 917,504      | 57,344        | 3,584        | 224           | 14           | E   |
| F   | 15,728,640   | 983,040      | 61,440        | 3,840        | 240           | 15           | F   |

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## Powers of 2 and 16

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### POWERS OF 2 AND 16

| POWERS OF 2 |          | POWERS OF 16              |          |
|-------------|----------|---------------------------|----------|
| Value       | Exponent | Value                     | Exponent |
| 1           | 0        | 1                         | 0        |
| 2           | 1        | 16                        | 1        |
| 4           | 2        | 256                       | 2        |
| 8           | 3        | 4,096                     | 3        |
| 16          | 4        | 65,536                    | 4        |
| 32          | 5        | 1,048,576                 | 5        |
| 64          | 6        | 16,777,216                | 6        |
| 128         | 7        | 268,435,456               | 7        |
| 256         | 8        | 4,294,967,296             | 8        |
| 512         | 9        | 68,719,476,736            | 9        |
| 1,024       | 10       | 1,099,511,627,776         | A        |
| 2,048       | 11       | 17,592,186,044,416        | B        |
| 4,096       | 12       | 281,474,976,710,656       | C        |
| 8,192       | 13       | 4,503,599,627,370,496     | D        |
| 16,384      | 14       | 72,057,594,037,927,936    | E        |
| 32,768      | 15       | 1,152,921,504,606,846,976 | F        |
| 65,536      | 16       |                           |          |
| 131,072     | 17       |                           |          |
| 262,144     | 18       |                           |          |
| 524,288     | 19       |                           |          |
| 1,048,576   | 20       |                           |          |
| 2,097,152   | 21       |                           |          |
| 4,194,304   | 22       |                           |          |
| 8,388,608   | 23       |                           |          |

## Field Attribute Characters

### FIELD ATTRIBUTE CHARACTERS

| DISPLAY ATTRIBUTES |         |           |        | HEXADECIMAL CHARACTERS |
|--------------------|---------|-----------|--------|------------------------|
| BRIGHT             | MODIFY  | ALL       | NOLINE | 80                     |
| BRIGHT             | MODIFY  | UPPERCASE | NOLINE | 81                     |
| BRIGHT             | MODIFY  | NUMERIC   | NOLINE | 82                     |
| BRIGHT             | PROTECT | ALL       | NOLINE | 84                     |
| BRIGHT             | PROTECT | UPPERCASE | NOLINE | 85                     |
| BRIGHT             | PROTECT | NUMERIC   | NOLINE | 86                     |
| DIM                | MODIFY  | ALL       | NOLINE | 88                     |
| DIM                | MODIFY  | UPPERCASE | NOLINE | 89                     |
| DIM                | MODIFY  | NUMERIC   | NOLINE | 8A                     |
| DIM                | PROTECT | ALL       | NOLINE | 8C                     |
| DIM                | PROTECT | UPPERCASE | NOLINE | 8D                     |
| DIM                | PROTECT | NUMERIC   | NOLINE | 8E                     |
| BLINK              | MODIFY  | ALL       | NOLINE | 90                     |
| BLINK              | MODIFY  | UPPERCASE | NOLINE | 91                     |
| BLINK              | MODIFY  | NUMERIC   | NOLINE | 92                     |
| BLINK              | PROTECT | ALL       | NOLINE | 94                     |
| BLINK              | PROTECT | UPPERCASE | NOLINE | 95                     |
| BLINK              | PROTECT | NUMERIC   | NOLINE | 96                     |
| BLANK              | MODIFY  | ALL       | NOLINE | 98                     |
| BLANK              | MODIFY  | UPPERCASE | NOLINE | 99                     |
| BLANK              | MODIFY  | NUMERIC   | NOLINE | 9A                     |
| BLANK              | PROTECT | ALL       | NOLINE | 9C                     |
| BLANK              | PROTECT | UPPERCASE | NOLINE | 9D                     |
| BLANK              | PROTECT | NUMERIC   | NOLINE | 9E                     |
| BRIGHT             | MODIFY  | ALL       | LINE   | A0                     |
| BRIGHT             | MODIFY  | UPPERCASE | LINE   | A1                     |
| BRIGHT             | MODIFY  | NUMERIC   | LINE   | A2                     |
| BRIGHT             | PROTECT | ALL       | LINE   | A4                     |
| BRIGHT             | PROTECT | UPPERCASE | LINE   | A5                     |
| BRIGHT             | PROTECT | NUMERIC   | LINE   | A6                     |
| DIM                | MODIFY  | ALL       | LINE   | A8                     |
| DIM                | MODIFY  | UPPERCASE | LINE   | A9                     |
| DIM                | MODIFY  | NUMERIC   | LINE   | AA                     |
| DIM                | PROTECT | ALL       | LINE   | AC                     |
| DIM                | PROTECT | UPPERCASE | LINE   | AD                     |
| DIM                | PROTECT | NUMERIC   | LINE   | AE                     |
| BLINK              | MODIFY  | ALL       | LINE   | B0                     |
| BLINK              | MODIFY  | UPPERCASE | LINE   | B1                     |
| BLINK              | MODIFY  | NUMERIC   | LINE   | B2                     |
| BLINK              | PROTECT | ALL       | LINE   | B4                     |
| BLINK              | PROTECT | UPPERCASE | LINE   | B5                     |
| BLINK              | PROTECT | NUMERIC   | LINE   | B6                     |
| BLANK              | MODIFY  | ALL       | LINE   | B8                     |
| BLANK              | MODIFY  | UPPERCASE | LINE   | B9                     |
| BLANK              | MODIFY  | NUMERIC   | LINE   | BA                     |
| BLANK              | PROTECT | ALL       | LINE   | BC                     |
| BLANK              | PROTECT | UPPERCASE | LINE   | BD                     |
| BLANK              | PROTECT | NUMERIC   | LINE   | BE                     |

## Translation Table

### TRANSLATION TABLE

| Dec | Hex | Binary | ASCII Printer<br>Graphics | ASCII Display<br>Graphics | EBCDIC |
|-----|-----|--------|---------------------------|---------------------------|--------|
|-----|-----|--------|---------------------------|---------------------------|--------|

|   |    |          |  |  |  |
|---|----|----------|--|--|--|
| 5 | 05 | 00000101 |  |  |  |
| 6 | 06 | 00000110 |  |  |  |
| 7 | 07 | 00000111 |  |  |  |
| 8 | 08 | 00001000 |  |  |  |
| 9 | 09 | 00001001 |  |  |  |

|    |    |          |  |  |  |
|----|----|----------|--|--|--|
| 15 | 0F | 00001111 |  |  |  |
| 16 | 10 | 00010000 |  |  |  |
| 17 | 11 | 00010001 |  |  |  |
| 18 | 12 | 00010010 |  |  |  |
| 19 | 13 | 00010011 |  |  |  |

|    |    |          |  |  |  |
|----|----|----------|--|--|--|
| 25 | 19 | 00011001 |  |  |  |
| 26 | 1A | 00011010 |  |  |  |
| 27 | 1B | 00011011 |  |  |  |
| 28 | 1C | 00011100 |  |  |  |
| 29 | 1D | 00011101 |  |  |  |

|    |    |          |    |    |  |
|----|----|----------|----|----|--|
| 35 | 23 | 00100011 | #  | #  |  |
| 36 | 24 | 00100100 | \$ | \$ |  |
| 37 | 25 | 00100101 | %  | %  |  |
| 38 | 26 | 00100110 | &  | &  |  |
| 39 | 27 | 00100111 | '  | '  |  |

## Translation Table

### TRANSLATION TABLE (continued)

| Dec | Hex | Binary   | ASCII Printer<br>Graphics | ASCII Display<br>Graphics | EBCDIC |
|-----|-----|----------|---------------------------|---------------------------|--------|
| 45  | 2D  | 00101101 | -                         | -                         |        |
| 46  | 2E  | 00101110 | .                         | .                         |        |
| 47  | 2F  | 00101111 | /                         | /                         |        |
| 48  | 30  | 00110001 | 0                         | 0                         |        |
| 49  | 31  | 00110000 | 1                         | 1                         |        |
| 55  | 37  | 00110111 | 7                         | 7                         |        |
| 56  | 38  | 00111000 | 8                         | 8                         |        |
| 57  | 39  | 00111001 | 9                         | 9                         |        |
| 58  | 3A  | 00111010 | :                         | :                         |        |
| 59  | 3B  | 00111011 | ;                         | ;                         |        |
| 65  | 41  | 01000001 | A                         | A                         |        |
| 66  | 42  | 01000010 | B                         | B                         |        |
| 67  | 43  | 01000011 | C                         | C                         |        |
| 68  | 44  | 01000100 | D                         | D                         |        |
| 69  | 45  | 01000101 | E                         | E                         |        |
| 75  | 4B  | 01001011 | K                         | K                         | .      |
| 76  | 4C  | 01001100 | L                         | L                         | <      |
| 77  | 4D  | 01001101 | M                         | M                         | (      |
| 78  | 4E  | 01001110 | N                         | N                         | +      |
| 79  | 4F  | 01001111 | O                         | O                         | !      |

## Translation Table

### TRANSLATION TABLE (continued)

| Dec | Hex | Binary   | ASCII Printer<br>Graphics | ASCII Display<br>Graphics | EBCDIC |
|-----|-----|----------|---------------------------|---------------------------|--------|
| 80  | 50  | 01010000 | P                         | P                         |        |
| 81  | 51  | 01010001 | Q                         | Q                         |        |
| 82  | 52  | 01010010 | R                         | R                         |        |
| 83  | 53  | 01010011 | S                         | S                         |        |
| 84  | 54  | 01010100 | T                         | T                         |        |
| 85  | 55  | 01010101 | U                         | U                         |        |
| 86  | 56  | 01010110 | V                         | V                         |        |
| 87  | 57  | 01010111 | W                         | W                         |        |
| 88  | 58  | 01011000 | X                         | X                         |        |
| 89  | 59  | 01011001 | Y                         | Y                         |        |
| 90  | 5A  | 01011010 | Z                         | Z                         |        |
| 91  | 5B  | 01011011 | [                         | [                         |        |
| 92  | 5C  | 01011100 | ^                         | ^                         |        |
| 93  | 5D  | 01011101 | _                         | _                         |        |
| 94  | 5E  | 01011110 | `                         | `                         |        |
| 95  | 5F  | 01011111 | -                         |                           | -      |
| 96  | 60  | 01100000 |                           |                           | /      |
| 97  | 61  | 01100001 | a                         | a                         |        |
| 98  | 62  | 01100010 | b                         | b                         |        |
| 99  | 63  | 01100011 | c                         | c                         |        |
| 100 | 64  | 01100100 | d                         | d                         |        |
| 101 | 65  | 01100101 | e                         | e                         |        |
| 102 | 66  | 01100110 | f                         | f                         |        |
| 103 | 67  | 01100111 | g                         | g                         |        |
| 104 | 68  | 01101000 | h                         | h                         |        |
| 105 | 69  | 01101001 | i                         | i                         |        |
| 106 | 6A  | 01101010 | j                         | j                         |        |
| 107 | 6B  | 01101011 | k                         | k                         |        |
| 108 | 6C  | 01101100 | l                         | l                         | %      |
| 109 | 6D  | 01101101 | m                         | m                         | -      |
| 110 | 6E  | 01101110 | n                         | n                         |        |
| 111 | 6F  | 01101111 | o                         | o                         |        |
| 112 | 70  | 01110000 | p                         | p                         |        |
| 113 | 71  | 01110001 | q                         | q                         |        |
| 114 | 72  | 01110010 | r                         | r                         |        |
| 115 | 73  | 01110011 | s                         | s                         |        |
| 116 | 74  | 01110100 | t                         | t                         |        |
| 117 | 75  | 01110101 | u                         | u                         |        |
| 118 | 76  | 01110110 | v                         | v                         |        |
| 119 | 77  | 01110111 | w                         | w                         |        |



## Translation Table

### TRANSLATION TABLE (continued)

| Dec | Hex | Binary   | ASCII Printer Graphics | ASCII Display Graphics | EBCDIC |
|-----|-----|----------|------------------------|------------------------|--------|
| 120 | 78  | 01111000 |                        |                        |        |
| 121 | 79  | 01111001 |                        |                        |        |
| 122 | 7A  | 01111010 |                        |                        |        |
| 123 | 7B  | 01111011 |                        |                        |        |
| 124 | 7C  | 01111100 |                        |                        |        |
| 125 | 7D  | 01111101 |                        | e                      | '      |
| 126 | 7E  | 01111110 |                        | c                      | =      |
| 127 | 7F  | 01111111 |                        |                        | "      |
| 128 | 80  | 10000000 |                        |                        |        |
| 129 | 81  | 10000001 |                        |                        | a      |
| 130 | 82  | 10000010 |                        |                        | b      |
| 131 | 83  | 10000011 |                        |                        | c      |
| 132 | 84  | 10000100 |                        |                        | d      |
| 133 | 85  | 10000101 |                        |                        | e      |
| 134 | 86  | 10000110 |                        |                        | f      |
| 135 | 87  | 10000111 |                        |                        | g      |
| 136 | 88  | 10001000 |                        |                        | h      |
| 137 | 89  | 10001001 |                        |                        | i      |
| 138 | 8A  | 10001010 |                        |                        |        |
| 139 | 8B  | 10001011 |                        |                        |        |
| 140 | 8C  | 10001100 |                        |                        |        |
| 141 | 8D  | 10001101 |                        |                        |        |
| 142 | 8E  | 10001110 |                        |                        |        |
| 143 | 8F  | 10001111 |                        |                        |        |
| 144 | 90  | 10010000 |                        |                        |        |
| 145 | 91  | 10010001 |                        |                        | j      |
| 146 | 92  | 10010010 |                        |                        | k      |
| 147 | 93  | 10010011 |                        |                        | l      |
| 148 | 94  | 10010100 |                        |                        | m      |
| 149 | 95  | 10010101 |                        |                        | n      |
| 150 | 96  | 10010110 |                        |                        |        |
| 151 | 97  | 10010111 |                        |                        |        |
| 152 | 98  | 10011000 |                        |                        |        |
| 153 | 99  | 10011001 |                        |                        |        |
| 154 | 9A  | 10011010 |                        |                        |        |
| 155 | 9B  | 10011011 |                        |                        |        |
| 156 | 9C  | 10011100 |                        |                        |        |
| 157 | 9D  | 10011101 |                        |                        |        |
| 158 | 9E  | 10011110 |                        |                        |        |
| 159 | 9F  | 10011111 |                        |                        |        |

## Translation Table

### TRANSLATION TABLE (continued)

| Dec | Hex | Binary   | ASCII Printer Graphics | ASCII Display Graphics | EBCDIC |
|-----|-----|----------|------------------------|------------------------|--------|
| 160 | A0  | 10100100 |                        |                        |        |
| 161 | A1  | 10100101 |                        |                        |        |
| 162 | A2  | 10100110 |                        |                        |        |
| 163 | A3  | 10100111 |                        |                        |        |
| 164 | A4  | 10101000 |                        |                        |        |
| 165 | A5  | 10100101 |                        |                        | v      |
| 166 | A6  | 10100110 |                        |                        | w      |
| 167 | A7  | 10100111 |                        |                        | x      |
| 168 | A8  | 10101000 |                        |                        | y      |
| 169 | A9  | 10101001 |                        |                        | z      |
| 170 | AA  | 10101010 |                        |                        |        |
| 171 | AB  | 10101011 |                        |                        |        |
| 172 | AC  | 10101100 |                        |                        |        |
| 173 | AD  | 10101101 |                        |                        |        |
| 174 | AE  | 10101110 |                        |                        |        |
| 175 | AF  | 10101111 |                        |                        |        |
| 176 | B0  | 10110000 |                        |                        |        |
| 177 | B1  | 10110001 |                        |                        |        |
| 178 | B2  | 10110010 |                        |                        |        |
| 179 | B3  | 10110011 |                        |                        |        |
| 180 | B4  | 10110100 |                        |                        |        |
| 181 | B5  | 10110101 |                        |                        |        |
| 182 | B6  | 10110110 |                        |                        |        |
| 183 | B7  | 10110111 |                        |                        |        |
| 184 | B8  | 10111000 |                        |                        |        |
| 185 | B9  | 10111001 |                        |                        |        |
| 186 | BA  | 10111010 |                        |                        |        |
| 187 | BB  | 10111011 |                        |                        |        |
| 188 | BC  | 10111100 |                        |                        |        |
| 189 | BD  | 10111101 |                        |                        |        |
| 190 | BE  | 10111110 |                        |                        |        |
| 191 | BF  | 10111111 |                        |                        |        |
| 192 | C0  | 11000000 |                        |                        |        |
| 193 | C1  | 11000001 |                        |                        |        |
| 194 | C2  | 11000010 |                        |                        |        |
| 195 | C3  | 11000011 |                        |                        | C      |
| 196 | C4  | 11000100 |                        |                        | D      |
| 197 | C5  | 11000101 |                        |                        | E      |
| 198 | C6  | 11000110 |                        |                        | F      |
| 199 | C7  | 11000111 |                        |                        | G      |

## Translation Table

### TRANSLATION TABLE (continued)

| Dec | Hex | Binary   | ASCII Printer Graphics | ASCII Display Graphics | EBCDIC |
|-----|-----|----------|------------------------|------------------------|--------|
| 200 | C8  | 11001000 |                        |                        |        |
| 201 | C9  | 11001001 |                        |                        |        |
| 202 | CA  | 11001010 |                        |                        |        |
| 203 | CB  | 11001011 |                        |                        |        |
| 204 | CC  | 11001100 |                        |                        |        |
| 205 | CD  | 11001101 |                        |                        |        |
| 206 | CE  | 11001110 |                        |                        |        |
| 207 | CF  | 11001111 |                        |                        |        |
| 208 | D0  | 11010000 |                        |                        | }      |
| 209 | D1  | 11010001 |                        |                        | J      |
| 210 | D2  | 11010010 |                        |                        |        |
| 211 | D3  | 11010011 |                        |                        |        |
| 212 | D4  | 11010100 |                        |                        |        |
| 213 | D5  | 11010101 |                        |                        |        |
| 214 | D6  | 11010110 |                        |                        |        |
| 215 | D7  | 11010111 |                        |                        | P      |
| 216 | D8  | 11011000 |                        |                        | Q      |
| 217 | D9  | 11011001 |                        |                        | R      |
| 218 | DA  | 11011010 |                        |                        |        |
| 219 | DB  | 11011011 |                        |                        |        |
| 220 | DC  | 11011100 |                        |                        |        |
| 221 | DD  | 11011101 |                        |                        |        |
| 222 | DE  | 11011110 |                        |                        |        |
| 223 | DF  | 11011111 |                        |                        |        |
| 224 | E0  | 11100000 |                        |                        |        |
| 225 | E1  | 11100001 |                        |                        | S      |
| 226 | E2  | 11100010 |                        |                        | T      |
| 227 | E3  | 11100011 |                        |                        | U      |
| 228 | E4  | 11100100 |                        |                        | V      |
| 229 | E5  | 11100101 |                        |                        |        |
| 230 | E6  | 11100110 |                        |                        |        |
| 231 | E7  | 11100111 |                        |                        |        |
| 232 | E8  | 11101000 |                        |                        |        |
| 233 | E9  | 11101001 |                        |                        |        |
| 234 | EA  | 11101010 |                        |                        |        |





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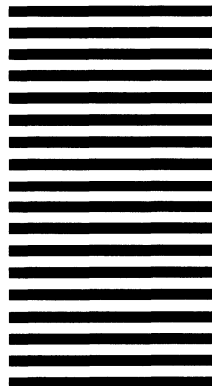
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